

Nested central volcanism related to rift development and giant landsliding in oceanic islands

J.C. Carracedo¹; H. Guillou²; M. Paterné²; S. Scaillet²; E. Rodríguez
Badiola³; F. J. Pérez Torrado⁴; A. Hansen⁴; R. Paris⁵

1. Estación Volcanológica de Canarias, CSIC, 38080 La Laguna, Tenerife, SPAIN
2. Laboratoire des Sciences du Climat et de l'Environnement, CEA-CNRS, 91118 Gif sur Yvette, FRANCE
3. Museo Nacional de Ciencias Naturales, CSIC, 28006 Madrid, SPAIN
4. Dptos. Física y Geografía, ULPGC, 35017 Las Palmas de Gran Canaria, SPAIN
5. Université Paris 1 Panthéon-Sorbonne, LGP URA, 8591 Meudon, FRANCE

The growth of composite volcanoes inside gravitational collapse embayments is a relatively frequent feature in the Canaries. These volcanoes are the direct consequence of the development of coherent rifts, and represent the continuation of their eruptive activity after the triggering of gravitational collapses, most probably when rift volcanism is at its peak. These conclusions, derived from detailed geological mapping, radiometric dating and stratigraphic and petrological observations in the Bejenado Volcano (La Palma), have been corroborated in similar studies carried out in the Teide Volcano and the NW and NE Rifts of Tenerife. In both volcanic scenarios, fissural basaltic eruptions continued to take place along the rifts after collapse, but much higher eruptive concentration at the rift junction inside the collapse embayment rapidly constructed a central volcano, evolving from basaltic-basanitic lavas to highly differentiated phonolitic-trachytic products. New radiocarbon and K/Ar ages and detailed mapping of the Teide-NW rift of Tenerife show a random temporal distribution of vents along the entire rift. Conversely, the initial basaltic composition of lavas rapidly changed towards a higher alkalinity inside the collapse embayment. The outcropping formations show an observable spatial distribution of compositions along the NW Rift, with consistently increasing alkalinity from basaltic-basanitic terms at the far end, to transitional in the middle areas and highly evolved phonolites in the junction with the NE rift inside the collapse embayment. The ages obtained range from about 30 ka (the oldest outcropping flow of Teide) to 1909 AD.